Install FreeBSD

Reference: NYCU CSCC SA Course

國立成功大學資訊工程系
Department of Computer Science and Information Engineering, NCKU

Outline

- FreeBSD version
  - 13.1-RELEASE
- Installing FreeBSD
  - From CD-ROM (iso image)
  - From SD Card

FreeBSD Version

FreeBSD Branches/Tags

- Three parallel development branches:
  - RELEASE
    - Suitable for production use
    - Latest Release: 13.1 (May, 2022) (13.2 is expected in March 2023)
      - http://www.freebsd.org/releases/
  - STABLE
    - Tested new features and bug fixes
    - ABI/KBI is "stable"
    - Still considered a development branch
  - CURRENT
    - Working space for FreeBSD developers
      - 14.0-CURRENT (2023)
      - http://www.freebsd.org/releng/

FreeBSD Versions

- FreeBSD–A.B.C–Type
  - A: major version Number
  - B: minor version Number
  - C: slight patch version number
  - Type: version type
    - PRERELEASE, BETA, RC
    - RELEASE
    - STABLE
    - CURRENT
- freebsd-version(1)
- -pN
  - patch level, increased after SA/EN announced

End-of-Life (EoL)

- The last supporting date of given OS version
  - Typically, no guaranteed security update/patch for an OS passed its EoL
- All OS have EoL
  - FreeBSD 13.0: 13.1-RELEASE + 3 months
  - Ubuntu 14.04 LTS: 2024-04
  - CentOS Linux 8: 2021-12-31
  - Windows 7: 2020-01-14
- If your OS is approaching its EoL, please consider updating it
  - Plan as early as possible
  - Good habit: prepare and evaluate upgrading when new version is out

Support Model

- Use FreeBSD as an example

  https://www.freebsd.org/security/#model

  > Under the current support model, each major version's stable branch is explicitly supported for 5 years, while each individual point release is only supported for three months after the next point release.

- Common support types
  - Normal (feature and security updates)
  - Security only (maintenance mode)
  - LTS (Long term support, good for services infrastructure)
  - Extended (longer than normal), paid (commercial) support, ...

FreeBSD Installation

Installation Handbook

- Complete installation guide and be found at
  - https://www.freebsd.org/doc/handbook/bsdinstall.html
  - https://www.freebsd.org/doc/zh_TW/books/handbook/bsdinstall.html

View of Disk (1)

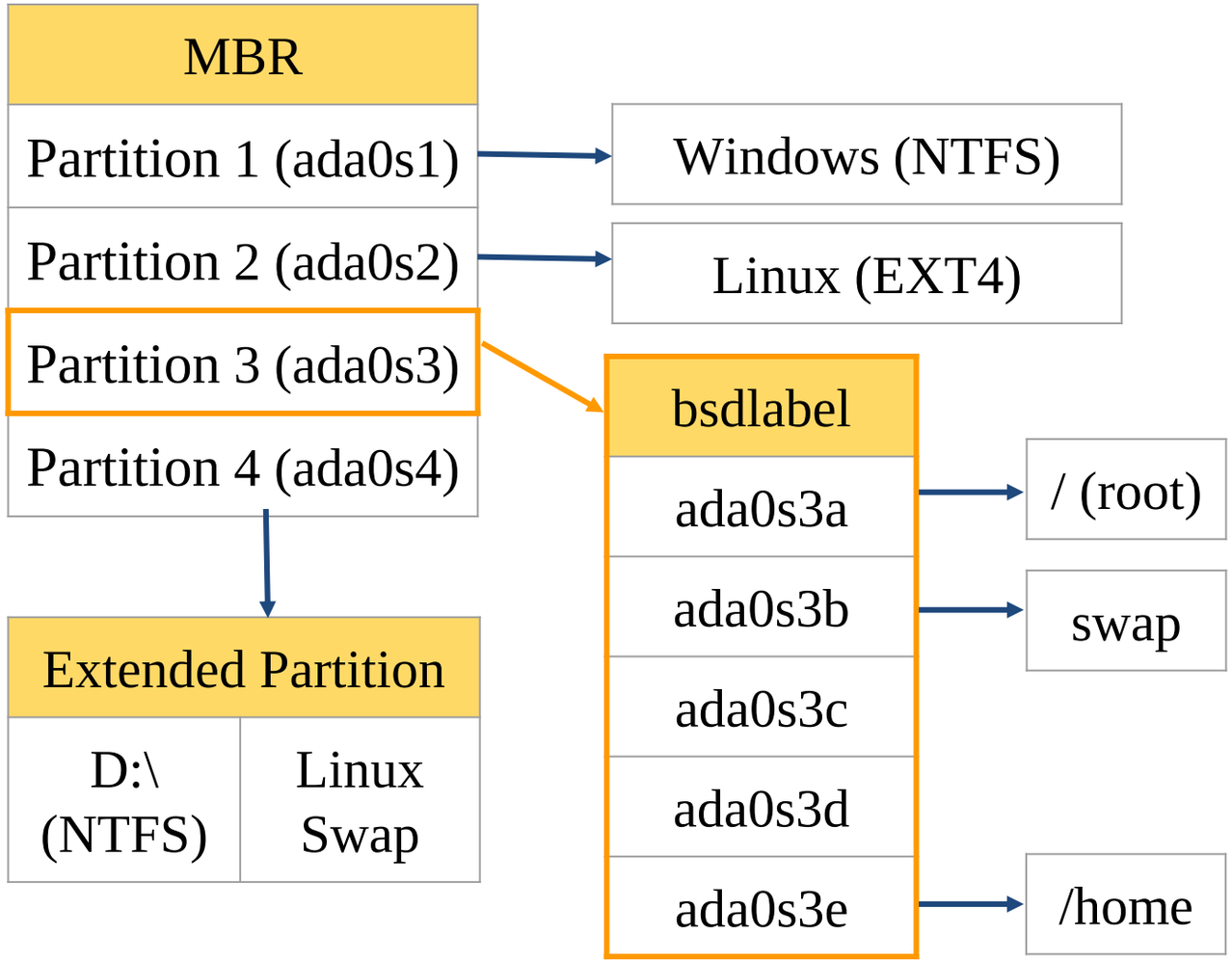
- Guided partitioning layout (GPT) between UFS and Root on ZFS

GPT (UFS)	
Partition 1 (/dev/ada0p1)	freebsd-boot
Partition 2 (/dev/ada0p2)	freebsd-ufs
Partition 3 (/dev/ada0p3)	freebsd-swap

GPT (ZFS on Root)	
Partition 1 (/dev/ada0p1)	freebsd-boot
Partition 2 (/dev/ada0p2)	freebsd-swap
Partition 3 (/dev/ada0p3)	freebsd-zfs

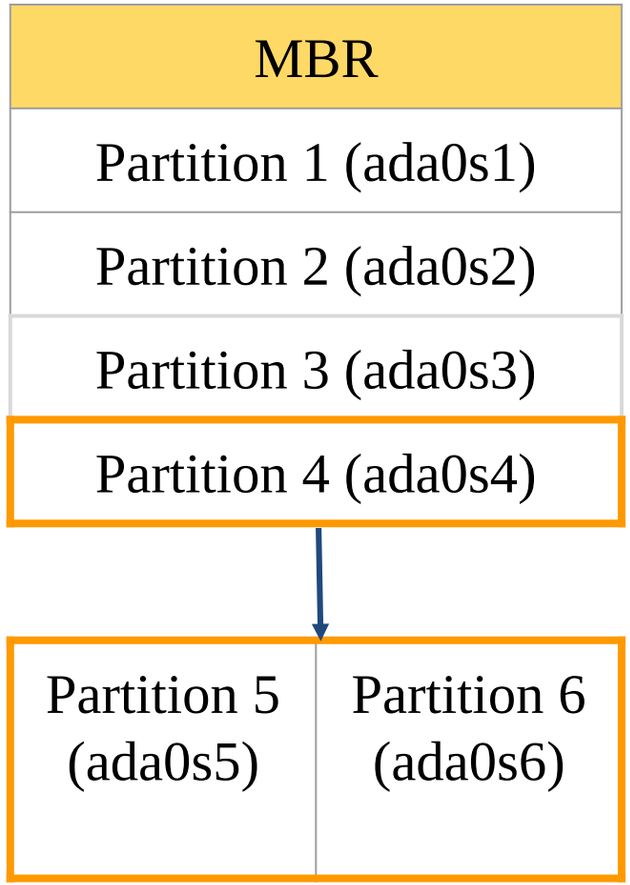
View of Disk (2)

ada0**p1**: GPT
ada0**s1**: MBR



FreeBSD View of Disk

- What is the meaning of ada0s1a
  - Disk name
    - ada : IDE, SATA
    - da: SCSI, usb stick
  - Partition (slice)
    - Primary partition: s1 ~ s4
    - Extended partition: s5 ~ sn
  - Label in each slice
    - a: root partition /
    - b: swap
    - c: entire slice
    - defgh: /usr, /home, …



Know Your Hardware

- CPU
  - 32bit or 64bit
  - Intel、AMD
  - Architecture: amd64, i386 (powerpc, mips, riscv, …)
- RAM
  - Size, Speed
- HDD
  - Size, amount, SATA, SCSI, SAS, …
- Graphics
  - Brand, ram size
- Sound
  - Brand

Know Your Hardware

- Network Interface and settings
  - Brand
  - Media type (10/100, 1G, 2.5G, 10G, …)
  - Hostname, IP, Netmask, Default gateway, DNS
- Other Special devices
  - pciconf -lv

Pre-Installation Tasks

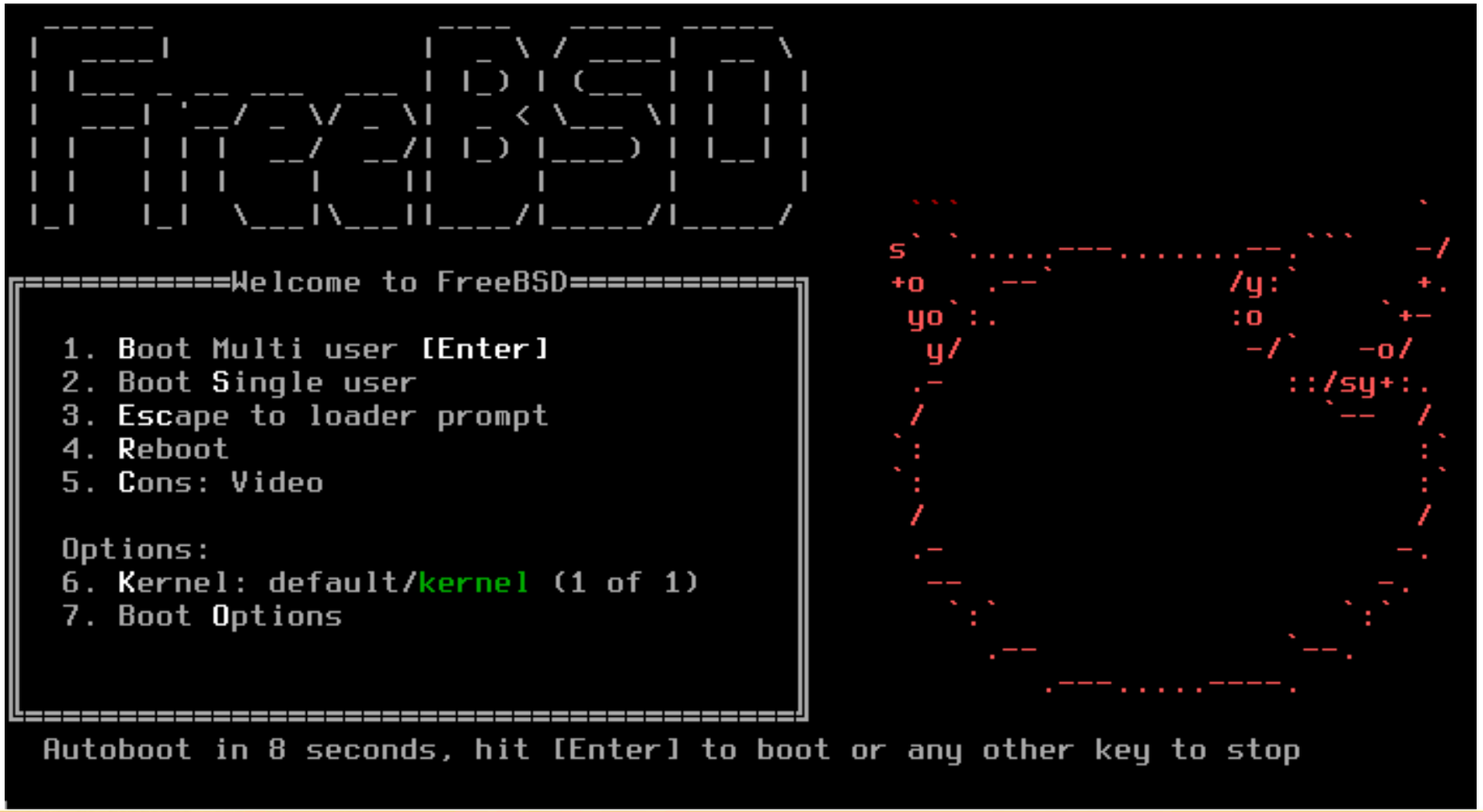
- Virtual Machine
  - VirtualBox、VMware、KVM
- Network Information
  - IP address
  - Subnet mask
  - Default router IP address
  - domain name of the local network
  - DNS server IP address(es)
- Prepare the Installation Media
  - https://www.freebsd.org/where.html
  - Installer image (iso, disc1 or dvd1)

bsdinstall

- bsdinstall (8)
- An easy to use, text-based installation program
  - Beginning with FreeBSD 9.0-RELEASE
- Official handbook
  - https://www.freebsd.org/doc/handbook/using-bsdinstall.html
  - https://www.freebsd.org/doc/zh_TW/books/handbook/using-bsdinstall.html

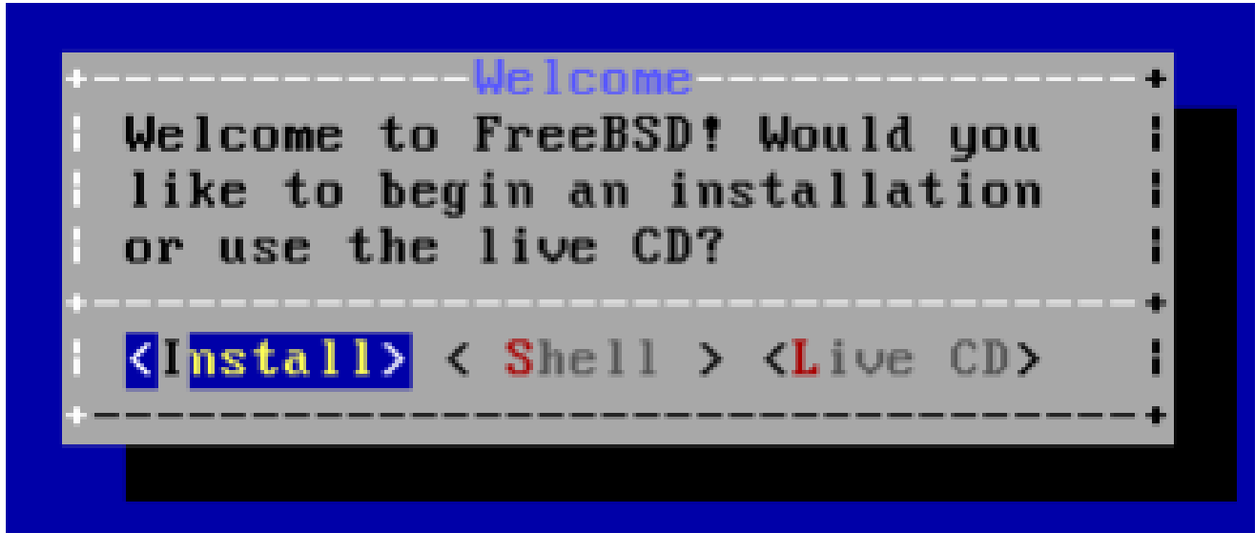
bsdinstall – (1)

- Boot screen of FreeBSD 13.1
  - Press Enter or Wait for autoboot



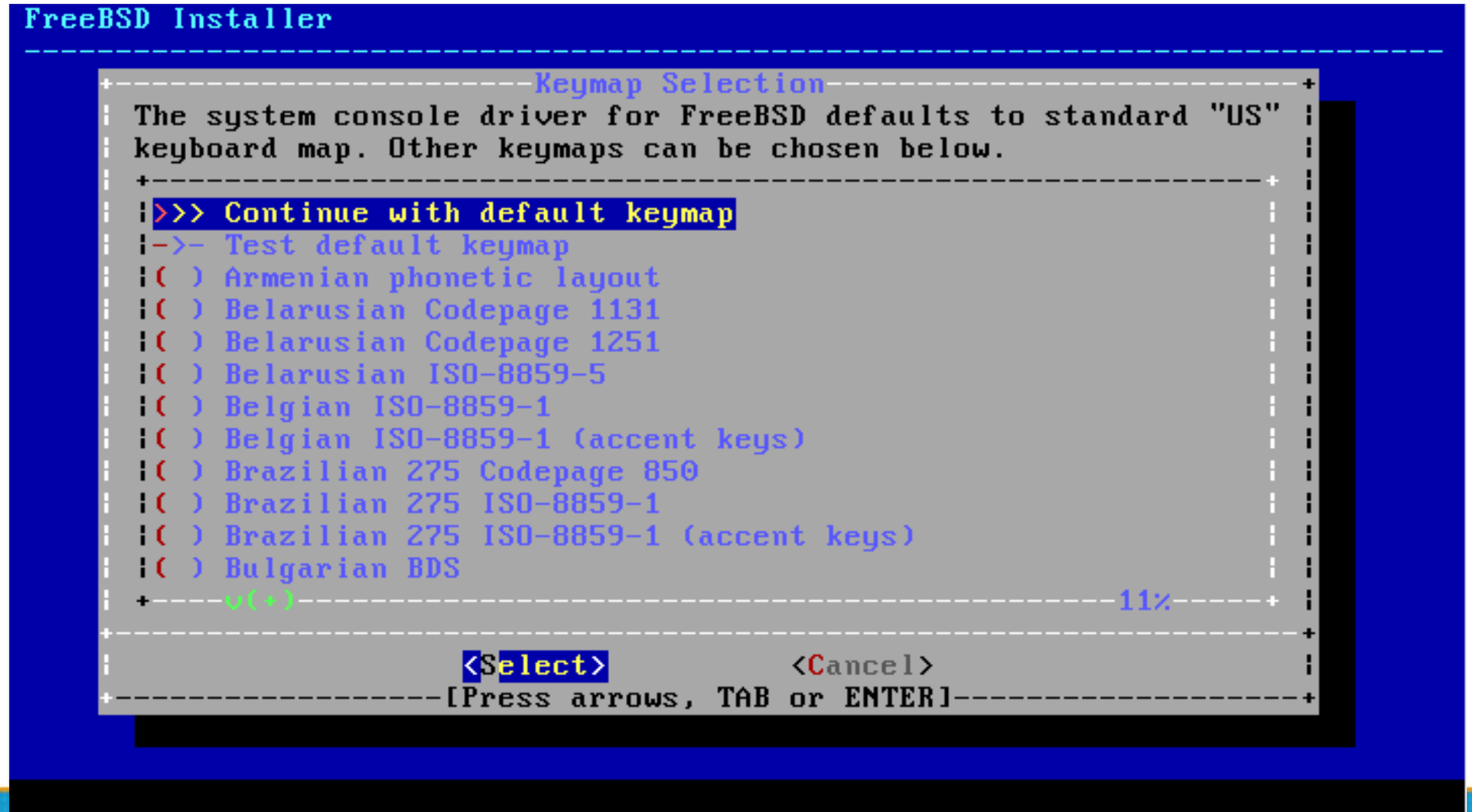
bsdinstall – (2)

- Install、Shell、Live CD
  - Choose “Install”



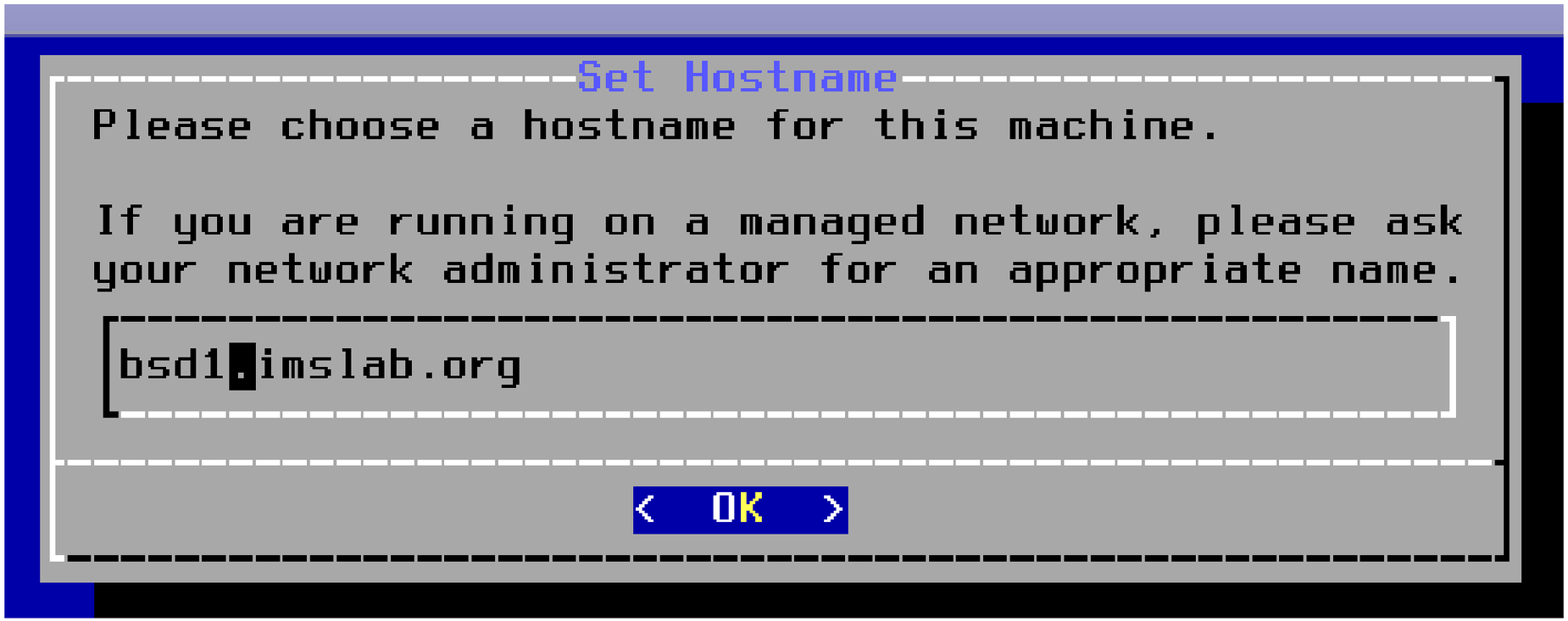
bsdinstall – (3)

- Select keymap
  - Select “Continue with default keymap”



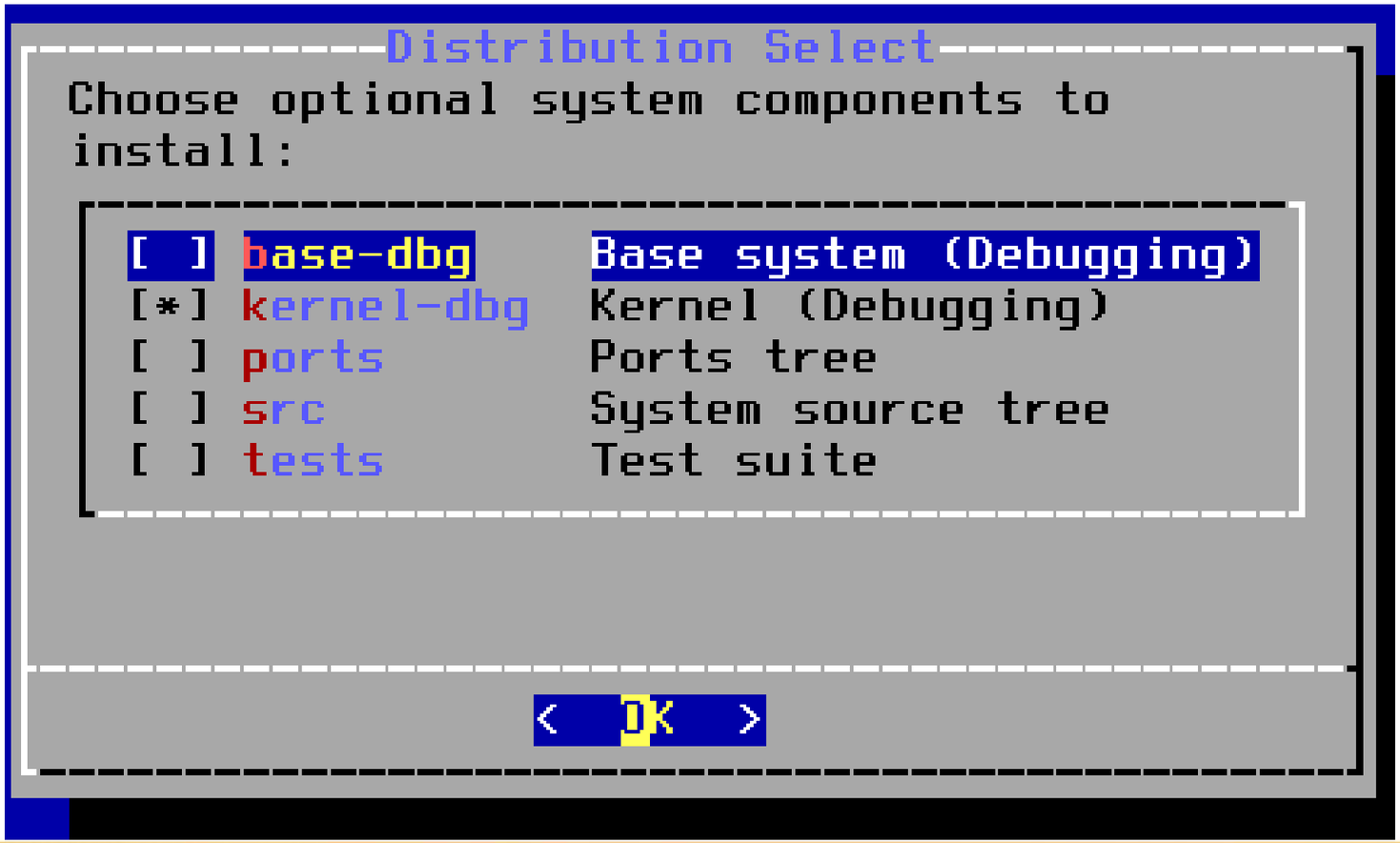
bsdinstall – (4)

- Setting hostname
  - e.g., xxx.cs.nycu.edu.tw



bsdinstall – (5)

- Select components to install
  - use default settings

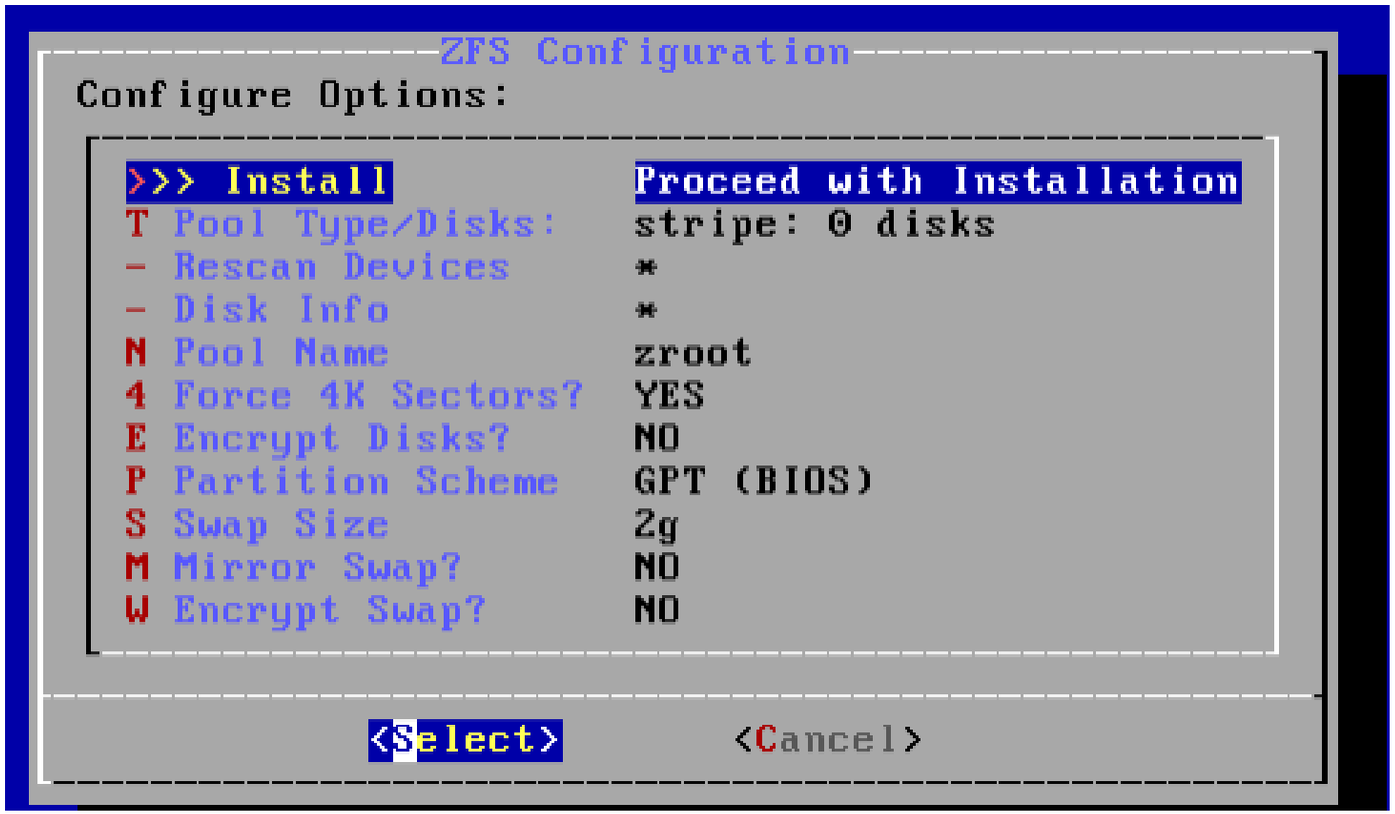


bsdinstall – (6)

- Partitioning methods
  - Shell – gpart(8)、fdisk(8)、bsdlabel(8)
  - Use Auto (ZFS)

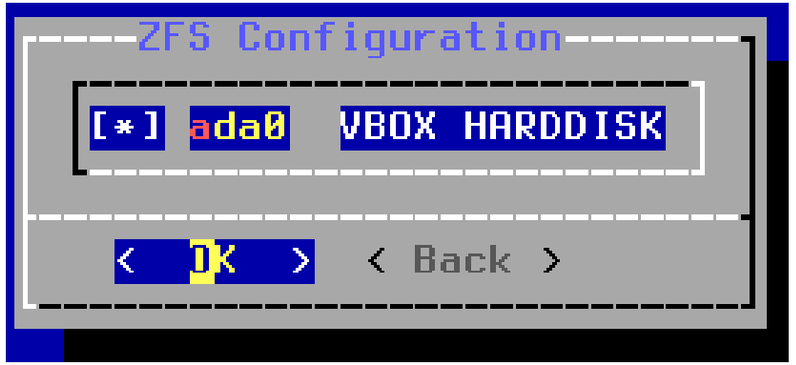
bsdinstall – (7) Auto (ZFS)

- Guided Root-on-ZFS
  - Keep the default settings, and choose “Install”



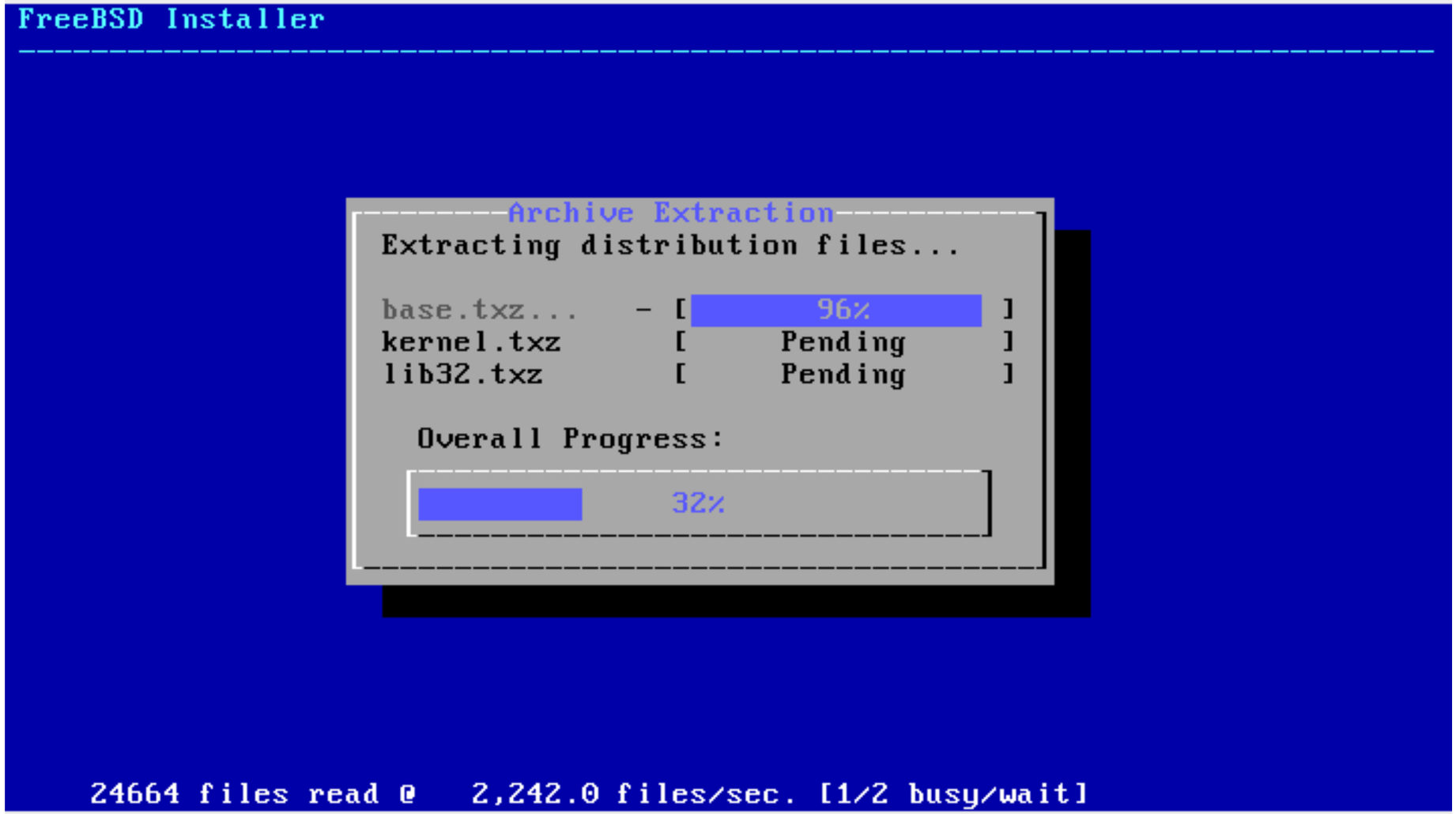
bsdinstall – (8)

- Virtual Device type
  - Stripe (select this type, and add a disk)
  - Mirror
  - RAID10
  - RAID-Z 1, 2, 3
- Caution! Backup important data when using dual OS



bsdinstall – (9)

- Fetching → Checksum Verification → Extraction

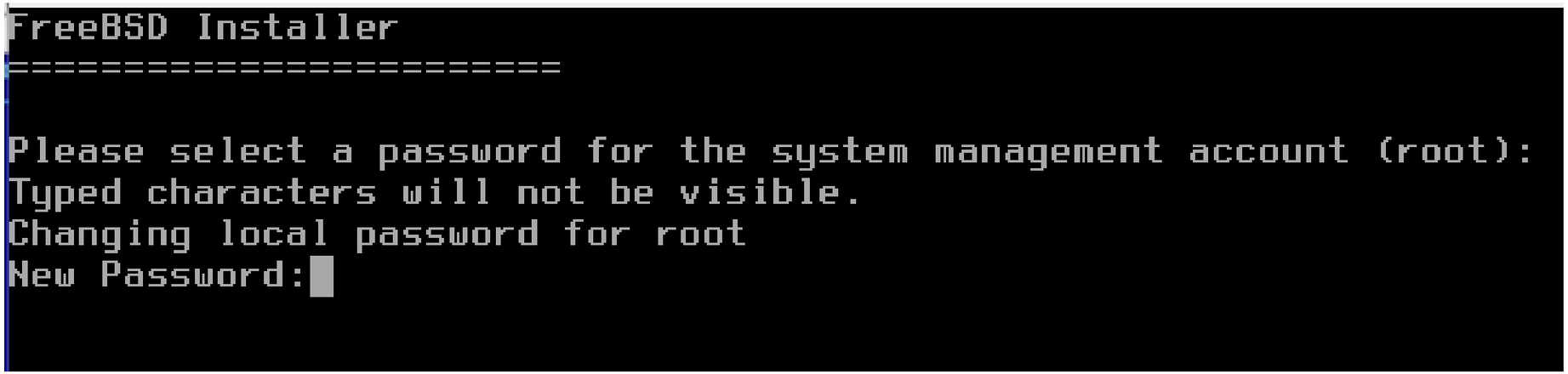


bsdinstall – (10)

- Post-installation
  - root password
  - Network interfaces
    - Wired – Static IPv4 / DHCP / Static IPv6 / SLAAC
    - Wireless
    - DNS
  - Time Zone
  - Services
  - System security hardening options
  - Add users

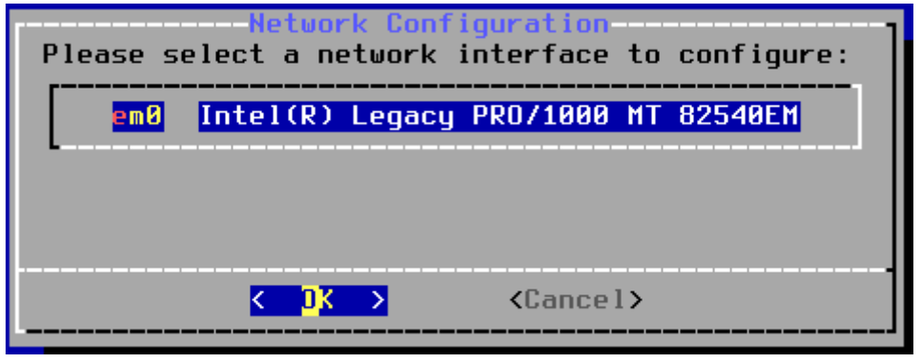
Post-installation

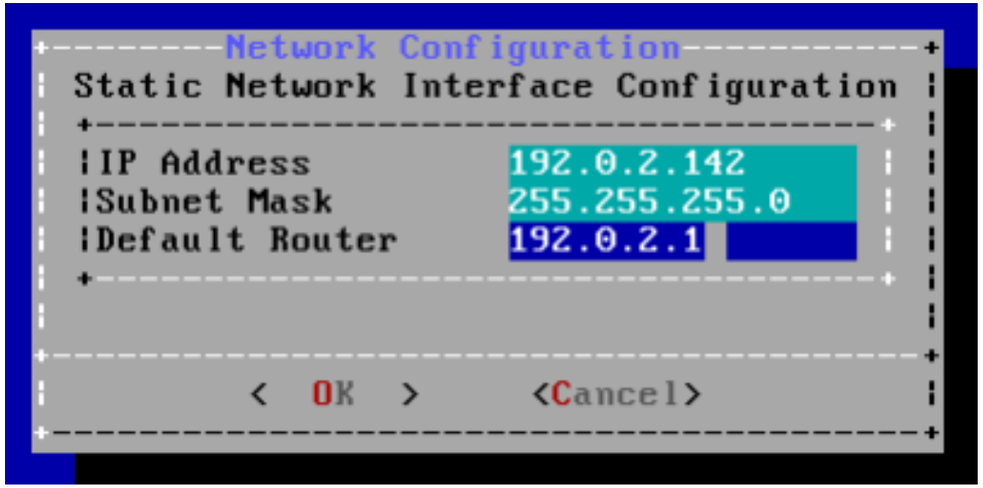
- Setting the root Password



Post-installation

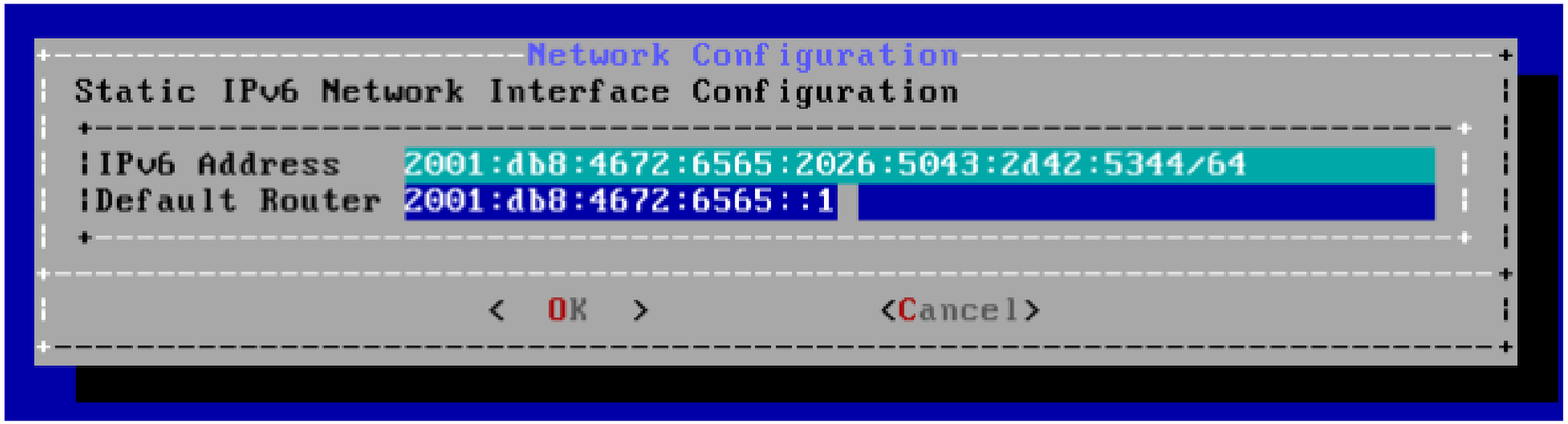
- Select a network interfaces
- Configuring IPv4 Networking with DHCP





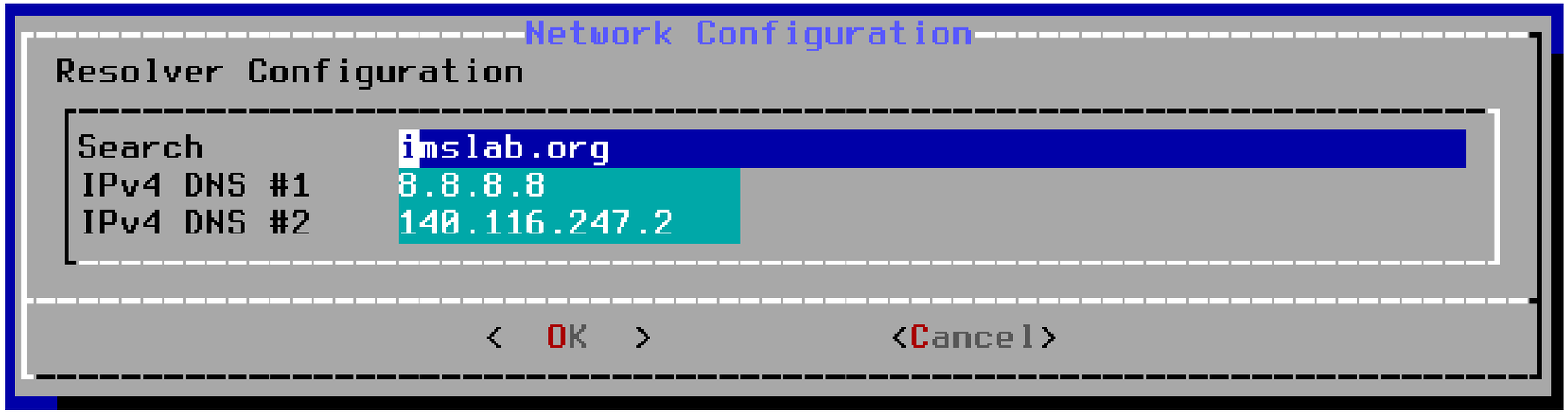
Post-installation

- Configuring IPv6 Networking
  - IPv6 Stateless Address Auto configuration (SLAAC)
  - http://tools.ietf.org/html/rfc4862
  - IPv6 is optional to you. We don't use IPv6 in this class.



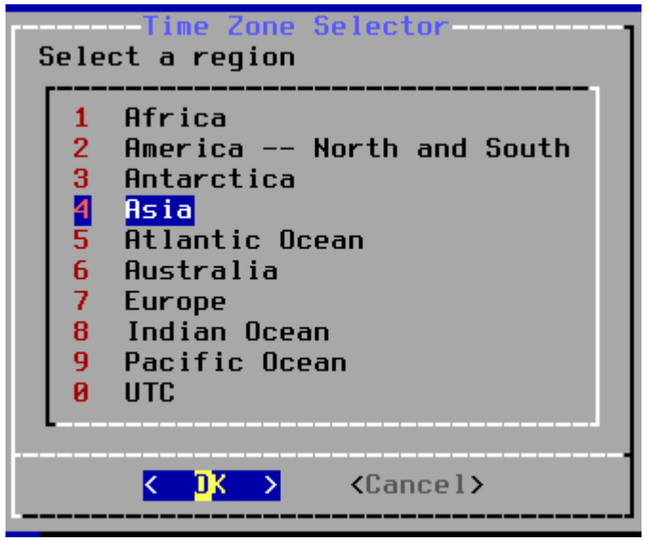
Post-installation

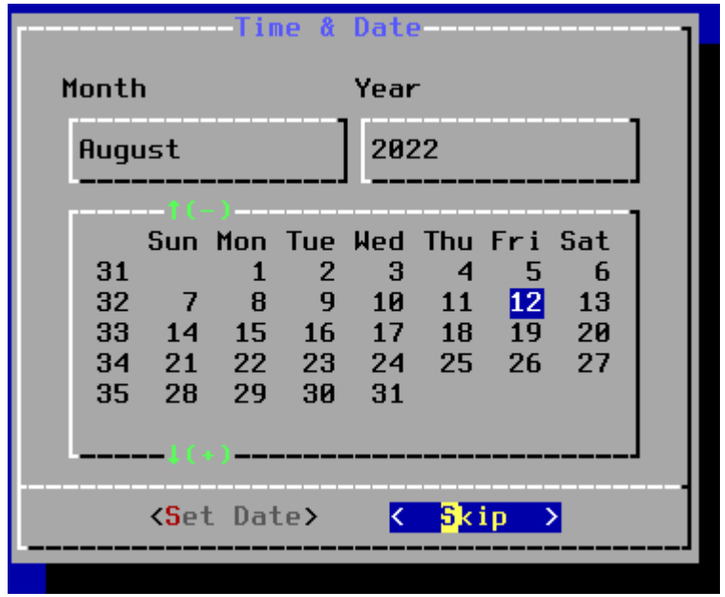
- Configuring DNS

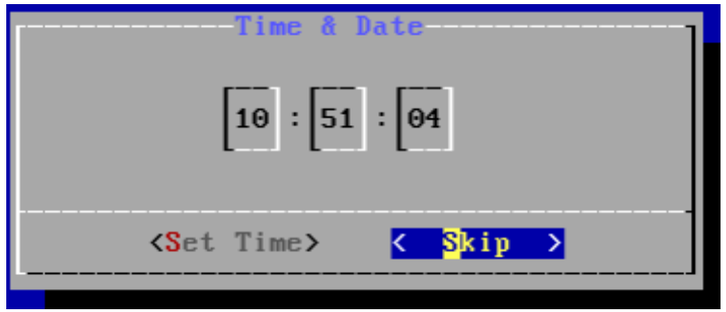


Post-installation

- Setting the Time Zone
  - Asia → Taiwan

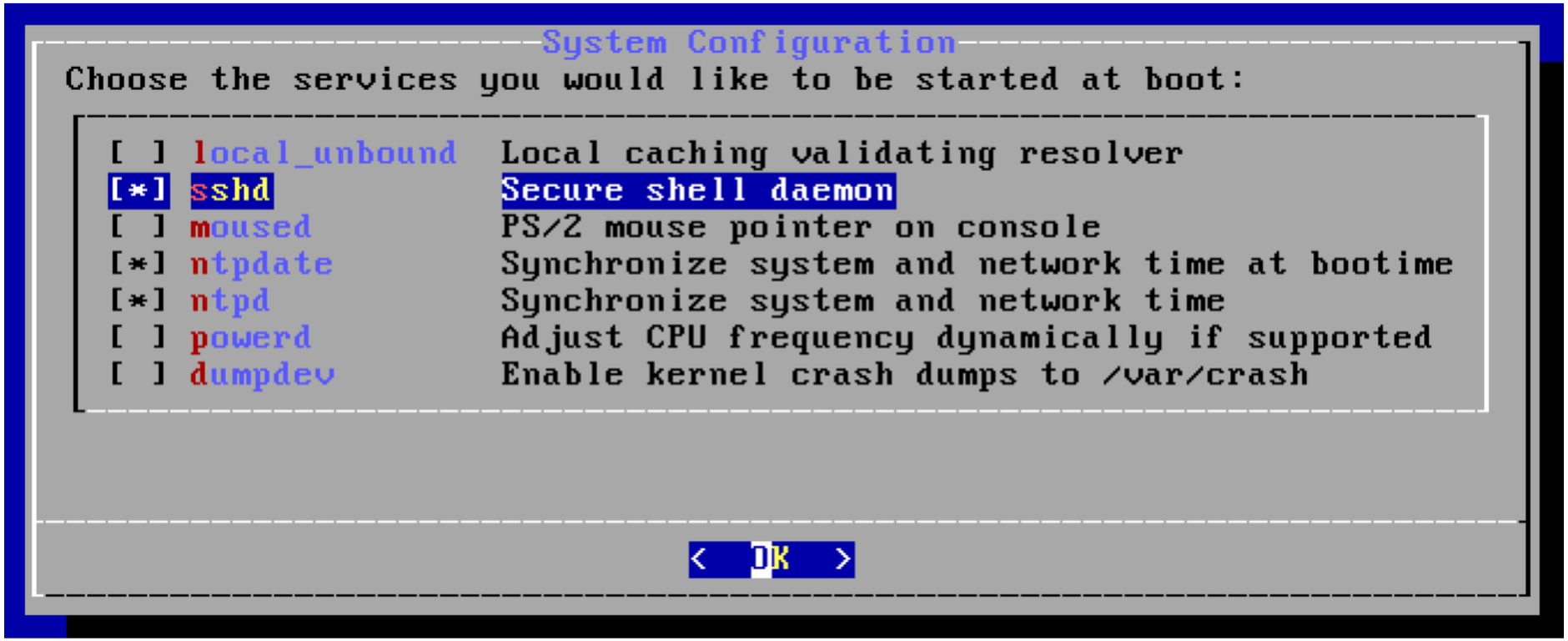






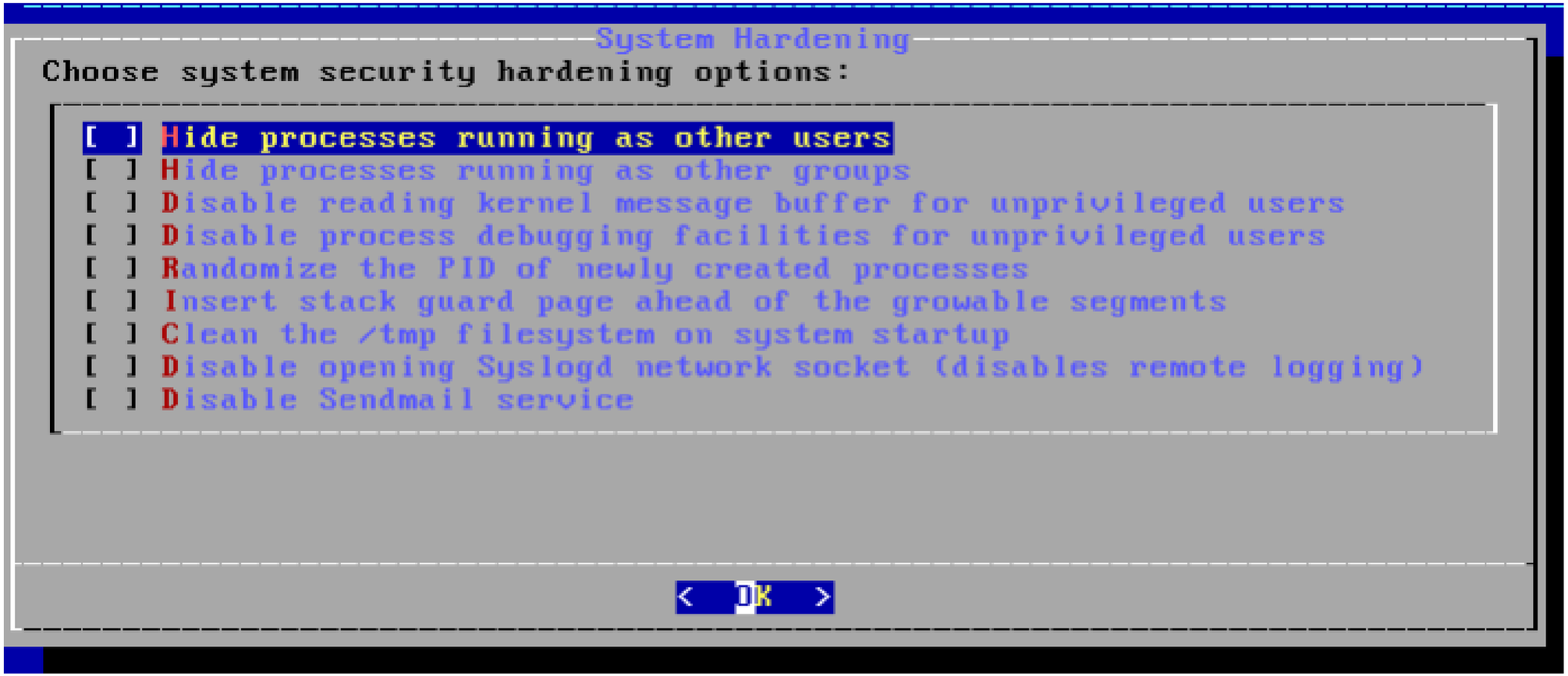
Post-installation

- Selecting services to be enabled at boot
  - Enable sshd, ntpd, ntpdate
  - Disable dumpdev



Post-installation

- Selecting system security hardening options
  - Use default settings



Post-installation

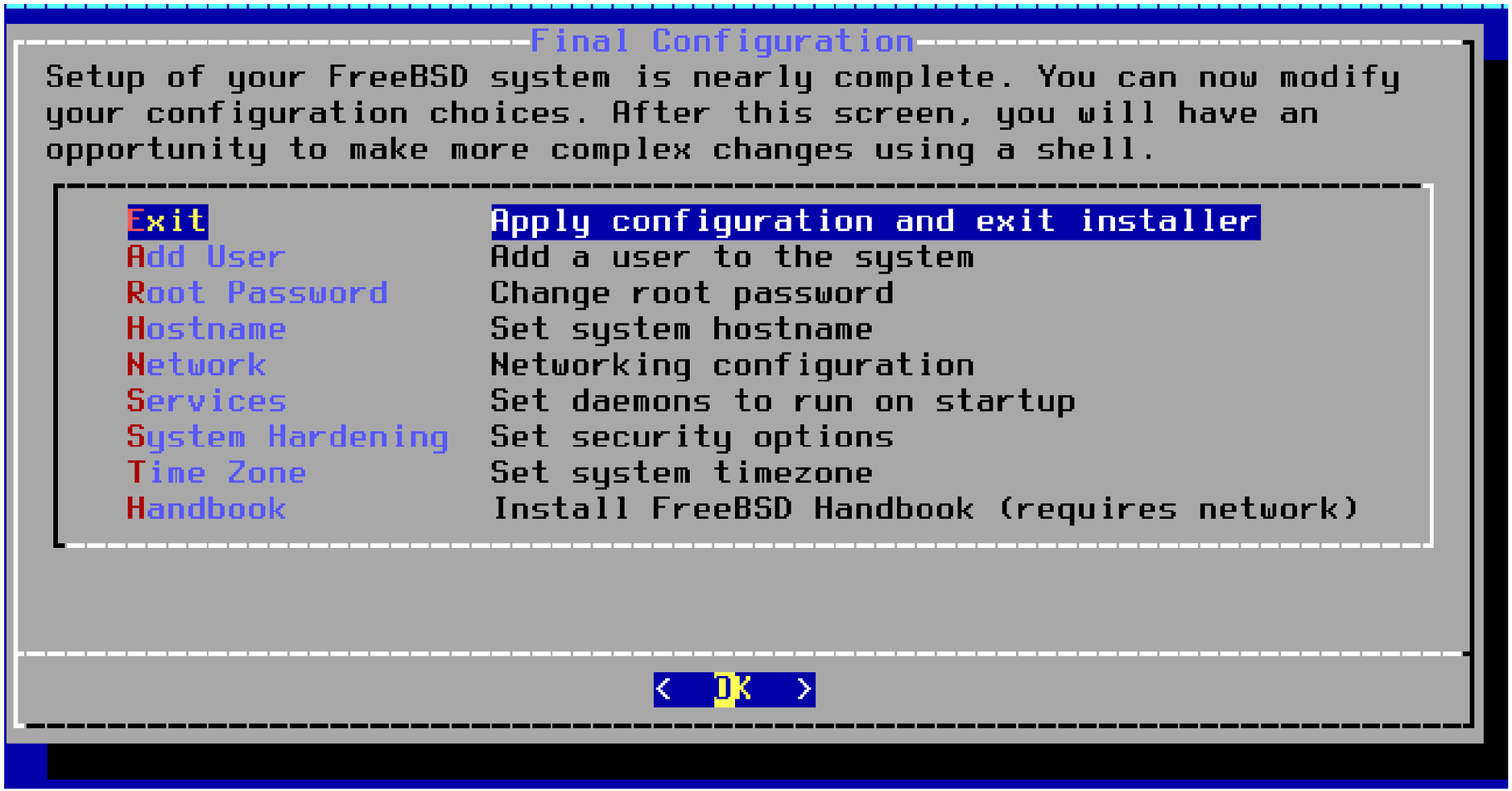
- Add Users
  - Username - tsaimh
  - Full name - Meng-Hsun Tsai
  - Uid - User ID. Typically left blank for default.
  - Login group - The user's group. - "staff" is good for you
  - Invite user into other groups? - wheel
  - Login class - Typically left blank for default.
  - Shell - The interactive shell for this user. CSCC use tcsh.
  - Home directory - The user's home directory. Use default.
  - Home directory permissions - The default is usually correct.
  - Use password-based authentication? - Typically "yes".

Post-installation

- Add Users (Cont.)
  - Use an empty password? - Typically "no".
  - Use a random password? - Typically "no".
  - Enter password - The actual password for this user.
  - Enter password again - The password must be typed again for verification.
  - Lock out the account after creation? - Typically "no".

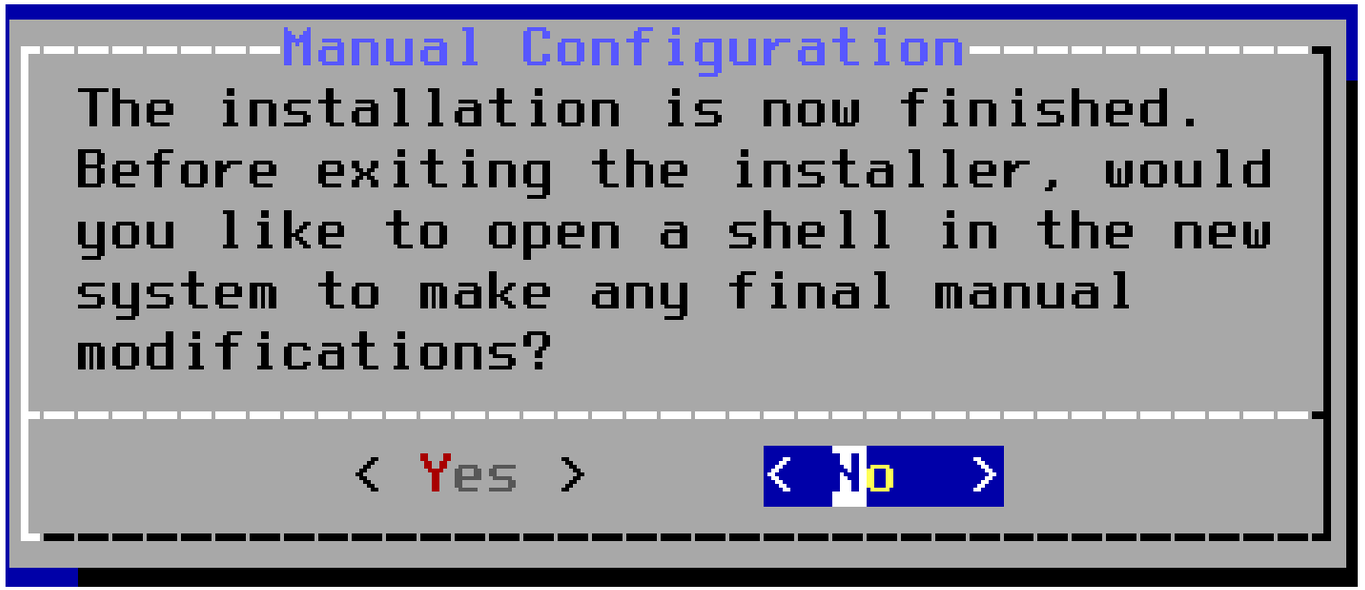
Post-installation

- Final Configuration



Post-installation

- Make sure the configuration is correct before exiting
- Remove installation media



Post-installation

- Update your system to latest patch (login as `root`)
  - `$ freebsd-update fetch install`
- Check your patch version
  - `$ uname -r`
  - Should be "13.1-RELEASE"

FreeBSD Handbook

- Chapter 2. Installing FreeBSD (FreeBSD 9.0 Release and Later)
  - http://www.tw.freebsd.org/doc/en/books/handbook/bsdinstall.html
- Chinese resources
  - https://www.tw.freebsd.org/doc/zh_TW/books/handbook/bsdinstall.html

Appendix

bsdinstall – Manual (UFS)

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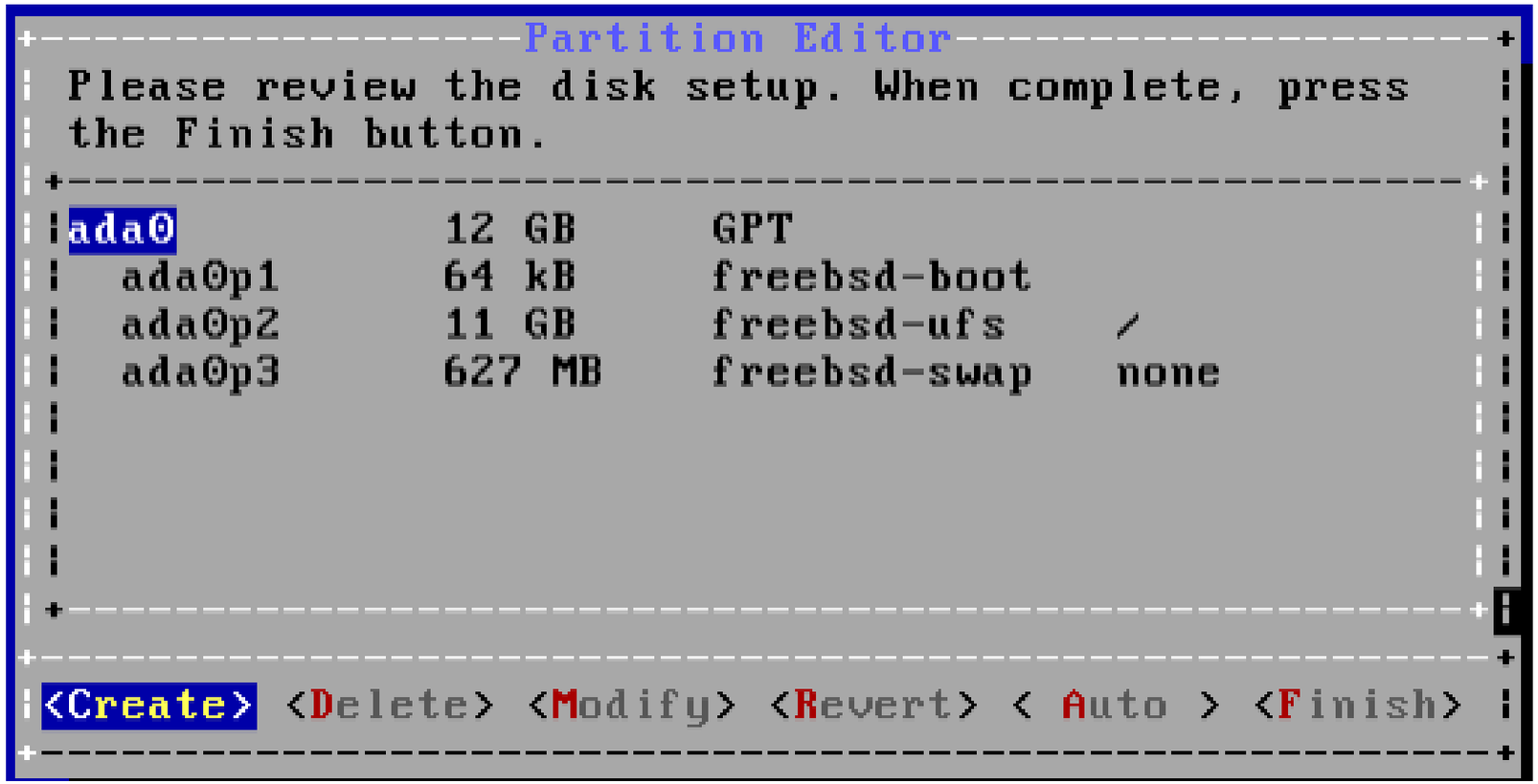
Department of Computer Science and Information Engineering, NCKU

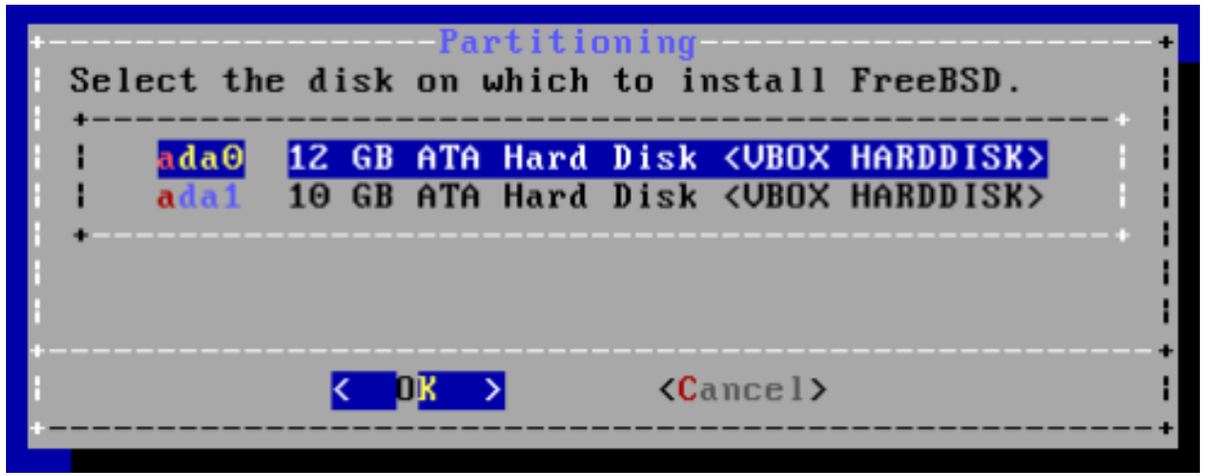
bsdinstall – Manual (UFS)

- Guided partitioning result



bsdinstall – Manual (UFS)

- Guided partitioning
  - Select disk



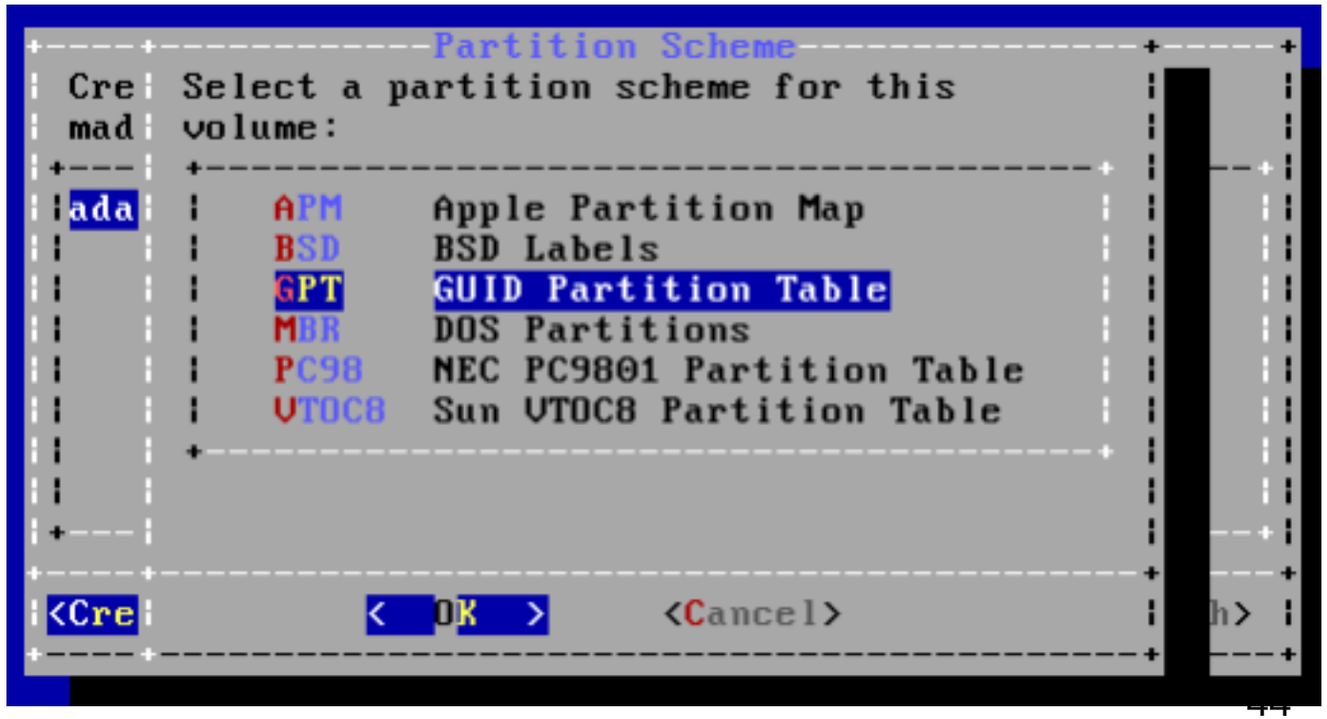
- How to partition the disk
  - Entire Disk
  - Partition – use free space

bsdinstall – Manual (UFS)

- Manual Partitioning

bsdinstall – Manual (UFS)

- Choose a partitioning scheme
  - Master Boot Record (MBR)
    - 4 Primary Partition, 1 Extended Partition, multiple Logical Partition
  - GUID Partition Table (GPT)
    - 128 Partitions per disk
  - DON’T use BSD
    - Some disk tools cannot identify this label

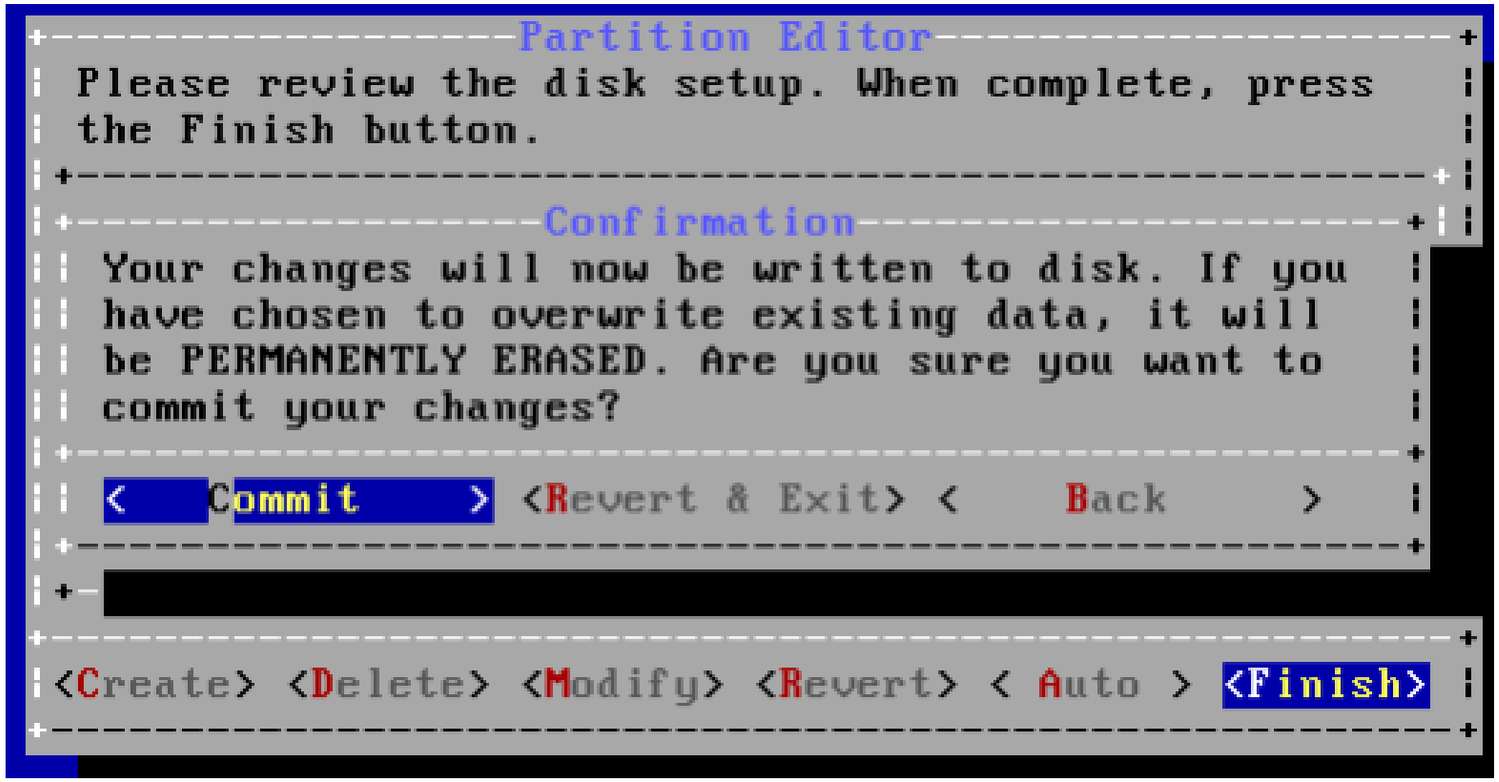


bsdinstall – Manual (UFS)

- Add partitions
  - freebsd-boot
  - FreeBSD boot code. This partition must be first on the disk.

bsdinstall – Manual (UFS)

- Final confirmation



bsdinstall – Manual (UFS)

- Reference (handbook)
  - https://www.freebsd.org/doc/handbook/bsdinstall-partitioning.html
  - https://www.freebsd.org/doc/zh_TW/books/handbook/bsdinstall-partitioning.html